

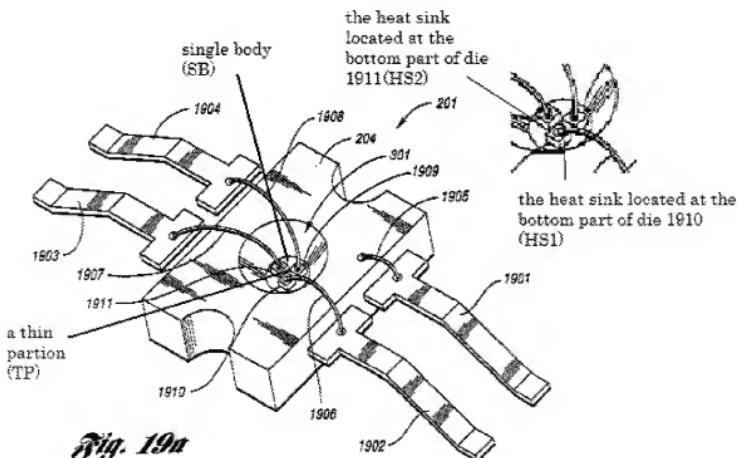
DETAILED ACTION

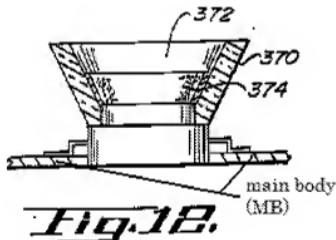
Claim Rejections - 35 USC § 103

1. 35 U.S.C. 103 Conditions for patentability; non-obvious subject matter.

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-6, 8-10 and 11-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (Patent No.: US 6335548 B1) (hereinafter Roberts) in view of Pederson (Patent No.: US 6590343 B2).





Regarding **Claim 1**, Roberts, one embodiment, FIGS. 19A-19B teaches a high power light emitting diode package comprising:

a insulation main body (204, col. 29, lines 61-65, note that could be an alternatively of another high thermal conductivity material such as ceramic, col. 10, lines 1-6);

at least two lead terminals (1902 & 1903, col. 30, lines 5-10) fixed to the main body (204); and

at least two heat sinks (HS1 & HS2, FIG. 19a [as shown above], note that HS1 and HS2 are sitting on top of heat extraction 204 which are conducting heat to 204 therefore they are considering as the heat sinks) of electrically and thermally conductive materials, the heat sinks being separated from each other and fixed to the main body (204).

However, Roberts, one embodiment, FIGS. 19A-19B does not disclose a heat sink of electrically and thermally conductive metallic materials

Nevertheless, Roberts, one embodiment, FIGS 5-6 does teach a heat sink of electrically and thermally conductive metallic materials (502, col. 16, lines 30-67)

Therefore, since Roberts, one embodiment, FIGS. 19A-19B and Roberts, one embodiment, FIGS 5-6 teach on the same endeavor. It would have been obvious to one

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ordinary skill in the art at the time the invention was made to further including a heat sink of electrically and thermally conductive metallic materials in Roberts, one embodiment, FIGS. 19A-19B, as taught by Roberts, one embodiment, FIGS 5-6. One would have been motivate to make such a change to improve electrical characteristic and performance of light emitting device (Roberts, BACKGROUND ART).

Furthermore, after the combining of Roberts, one embodiment, FIGS. 19A-19B and Roberts, one embodiment, FIGS 5-6 would teach at least two heat sinks of electrically and thermally conductive metallic materials.

However, Roberts et al., one embodiment, FIGS. 19A-B does not disclose wherein a lower portion of each of the light emitting diode is exposed to the outside of the bottom surface of the main body through the opening of the main body.

Nevertheless, Pederson, one embodiment, FIG. 12 does teach wherein the lower portion the light emitting diode (306) is exposed to the outside and through the opening of the main body (MB, FIG. 12 [as shown above], note that 306 is extending through the circuit substrate).

Therefore, since Roberts, one embodiment, FIGS. 19A-B and Pederson, one embodiment, FIG. 12 teach on the light emitting device. It would have been obvious to one ordinary skill in the art at the time the invention was made to further including wherein the light emitting diode is exposed to the outside and through the opening of the main body in Roberts et al., one embodiment, FIGS. 19A-B, as taught by Pederson, one embodiment, FIG. 12. One would have been motivate to make such a change to improve the electrical characteristic and performance of the light emitting device.

Furthermore, after the combining of Roberts, one embodiment, FIGS. 19A-B and Pederson, one embodiment, FIG. 12 would teach wherein a lower portion of each of the at least two heat sinks is exposed to the outside of the bottom surface of the main body through the opening of the main body.

Regarding **Claims 2-3**, Roberts, one embodiment, FIGS. 19A-19B further teaches the package of claim 1, wherein each of the at least two heat sinks (HS1 & HS2) has a reflective surface (301, col. 30, lines 9-11 & col. 12, lines 10-15) extended from an upper surface thereof (claim 2).

wherein the at least two heat sinks are a pair (HS1 & HS2, FIG. 19a as shown above) (claim 3).

Regarding **Claim 4**, Roberts, one embodiment, FIGS. 19A-19B further teaches the package of claim 3, further comprising: at least one light emitting diode die (top part of die 1910 or 1911) mounted on upper surfaces of the at least two heat sinks (HS1 & HS2), the die (1910 & 1911) being directly and electrically connected to the heat sinks (HS1 & HS2) through a surface of the die (top surface of 1910 & 1911).

Regarding **Claim 5**, Roberts, one embodiment, FIGS. 19A-19B further teaches the package of claim 4, further comprising: bonding wires (1906 & 1907) electrically connecting the at least two lead terminals (1902 & 1903), the at least two heat sinks (HS1 & HS2) and the at least one light emitting diode die (1910 & 1911).

Regarding **Claim 6**, Roberts, one embodiment, FIGS. 19A-19B further teaches the package of claim 4, further comprising: a lens (401, col. 30, lines 9-10) attached to the main body (204), the lens (401) enclosing the at least one light emitting diode die (1910 & 1911).

Regarding **Claim 8**, Roberts et al., one embodiment, FIGS. 19A-B further teaches the package of claim 4, further comprising: a fluorescent material converting the wavelength of light emitted from the at least one light emitting diode die (fluorescent dyes....within the encapsulant....re-emit it at lower wavelength, col. 24, lines 39-45, note that the encapsulant is the 203, FIG. 19B, col. 30, lines 8-10).

Regarding **Claim 9**, Roberts et al., one embodiment, FIGS. 19A-B further teaches the package of claim 1, further comprising:

light emitting diode dies (top surface of 1910 & 1911) mounted on the respective heat sinks (HS1 & HS2), the light emitting diode dies emitting different wavelengths of light (the three dies 1909, 1910 and 1911 emit at red, blue, and green wavelengths respectively, col. 30, lines 13-14).

Regarding **Claim 10**, Roberts et al., one embodiment, FIGS. 19A-B further teaches the package of claim 9, wherein the at least two lead terminals (1902 & 1903) include:

lead terminals (1902 & 1903) electrically connected to the at least two heat sinks (HS1 & HS2) respectively; and a common lead terminal electrically connected to all of the at least two heat sinks (the base (cathode) of the dies, the cup 301 and 204, col. 29, lines 61-67 and col. 30, lines 1-11, FIG. 9a).

Regarding **Claim 12**, Roberts et al., one embodiment, FIGS. 19A-B further teaches the package of claim 9, wherein the light emitting diode dies include light emitting diode dies (1909, 1910, and 1911) emitting a first wavelength of light (red), a second wavelength of light (blue) and a third wavelength of light (green), respectively.

Regarding **Claim 13**, Roberts et al., one embodiment, FIGS. 19A-B further teaches wherein the first wavelength, the second wavelength and the third wavelength are red

wavelength, green wavelength and blue wavelength, respectively (the three dies 1909, 1910 and 1911 emit at red, blue, and green wavelengths respectively, col. 30, lines 13-14).

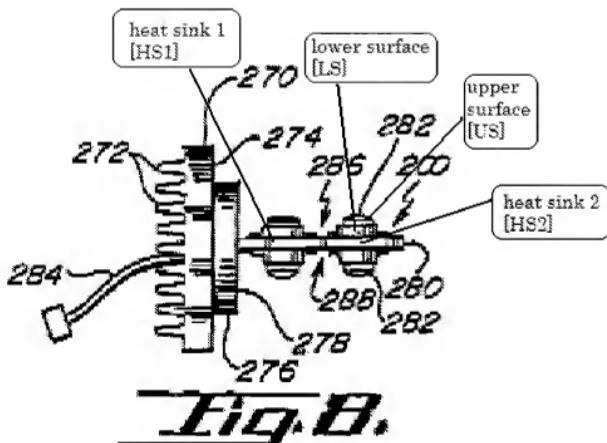
Regarding **Claim 15**, the combining of Roberts et al., one embodiment, FIGS. 19A-B further teaches the package of claim 1, further comprising at least one septum (TP, Fig. 19a [as shown above]) formed in a single body (SB) along with the main body (204) to separate the at least two heat sinks (HS1 & HS2).

Regarding **Claim 11 and 14**, Roberts, one embodiment, FIGS. 19A-B further does not disclose the limitation as claims 11 and 14.

Nevertheless, Pederson does teach an additional heat sink (346, FIG. 18, col. 14, lines 45-50); and a zener diode (614, FIG. 24, col. 18, lines 60-65) mounted on the additional heat sink (note that the zener diode is mounted on one of the opening 344, FIG. 18) (claim 11), and

a controller (50, FIG. 26, col. 12, lines 10-20) for controlling the electric power supplied to the light emitting diode package (608, 610, 612), wherein the controller controls the amount of the current supplied to the respective heat sinks (microcontroller 900 switches to decrease the current, see the ABSTRACT) (claim 14).

Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to include all the limitation in claims 11 and 14, as taught by Pederson. One would have been motivate to make such a change to optimize the performance of the LED (Pederson, col. 1, lines 10-30), and inclusion of such would improve the photometric efficiency.



Regarding **Claim 16**, Roberts, one embodiment, FIGS. 19A-19B teaches a high power light emitting diode package comprising:

an insulation main body (204, note that could be an alternatively of another high thermal conductivity material such as ceramic, col. 10, lines 1-6);

at least two lead terminals (1902 & 1903) fixed to the main body (204);

at least two heat sinks of electrically and thermally conductive materials (HS1 & HS2), the heat sinks being separated from each other and fixed to the main body (204),

However, Roberts et al., one embodiment, FIGS. 19A-B does not disclose each of the at least two heat sinks having an upper surface and a lower surface, the lower surface of each of the at least two heat sinks being relatively wider than the upper surface of each of the at least two heat sinks; and a light emitting diode die mounted on one of the upper

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surfaces of the heat sinks, the light emitting diode die having a lower surface facing the upper surface of each of the at least two heat sinks, wherein the upper surface of each of the at least two heat sinks is wider than the lower surface of the light emitting diode die, so that the light emitting diode die is mounted partly on a portion of the heat sink.

Nevertheless, Pederson, one embodiment, FIGS. 7-9 does teach each of the at least two heat sinks ([HS1], [HS2]) having an upper surface ([US], FIG. 8, as shown above) and a lower surface [LS], the lower surface [LS] of each of the at least two heat sinks ([HS1], [HS2]) being relatively wider than the upper surface [US] of each of the at least two heat sinks ([HS1], [HS2]); and

a light emitting diode die (282, [0105]) mounted on one of the upper surfaces of the heat sinks ([HS1], [HS2]), the light emitting diode die having a lower surface (bottom surface of 282) facing the upper surface (top surface of [HS1] & [HS2]) of each of the at least two heat sinks ([HS1], [HS2]),

wherein the upper surface of each of the at least two heat sinks is wider than the lower surface of the light emitting diode die (note that the LED illumination sources 282 is embedded inside the top surface of [HS1] & [HS2]), so that the light emitting diode die (282) is mounted partly on a portion of the heat sink (top portion of upper surface of HS1 & HS2).

Therefore, since Roberts, one embodiment, FIGS. 19A-B and Pederson, one embodiment, FIG. 12 teach on the light emitting device. It would have been obvious to one ordinary skill in the art at the time the invention was made to further including each of the at least two heat sinks having an upper surface and a lower surface, the lower surface of each of the at least two heat sinks being relatively wider than the upper surface of each of the at least two heat sinks; and a light emitting diode die mounted on one of the upper

surfaces of the heat sinks, the light emitting diode die having a lower surface facing the upper surface of each of the at least two heat sinks, wherein the upper surface of each of the at least two heat sinks is wider than the lower surface of the light emitting diode die, so that the light emitting diode die mounted partly on a portion of the heat sink in Roberts et al., one embodiment, FIGS. 19A-B, as taught by Pederson, one embodiment, FIGS. 7-9. One would have been motivate to make such a change to provide a unique and desired combination lighting effect (Pederson, col. 1, lines 10-30).

In regards to **Claims 17-18**, Roberts, one embodiment, FIGS. 19A-B differs from the invention by not showing wherein the at least two heat sinks each consist of either copper, gold, silver, or aluminum. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to further including wherein the at least two heat sinks each consist of either copper, gold, silver, or aluminum since it has been held to be within the general skill of a worker in the art to select a known material such as copper, gold, silver, or aluminum for conducting heat on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

3. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (Patent No.: US 6335548 B1) (hereinafter Roberts) in view of Pederson, one embodiment, FIG. 12 and further in view of Roberts et al., another embodiment, FIGS. 1-15 filed in IDS on 7/26/07.

Regarding **Claim 7**, Roberts, one embodiment, FIGS. 19A-B further discloses wherein the lens (401) includes at least one light emitting diode die (1910).

However, Roberts, one embodiment, FIGS. 19A-B and Pederson, one embodiment, FIGS. 15-16 do not disclose includes an optically transparent material which is directly contacted with the at least one light emitting diode die.

Nevertheless, Roberts et al., another embodiment, FIGS. 1-15 does teach includes an optically transparent material (501, FIG. 5, col. 17, lines 48-50) which is directly contacted with the at least one light emitting diode die (1910).

Therefore, since all three Roberts, one embodiment, FIGS. 19A-B, Pederson, one embodiment, FIG. 12 and Roberts et al., another embodiment, FIGS. 1-15 teach on the same light emitting device. It would have been obvious to one ordinary skill in the art at the time the invention was made to further including includes an optically transparent material which is directly contacted with the at least one light emitting diode die in Roberts, one embodiment, FIGS. 19A-B and Pederson, one embodiment, FIG. 12, as taught by Roberts et al., another embodiment, FIGS. 1-15. One would have been motivate to make such a change to improve the electrical characteristic and performance of the light emitting device.

Response to Arguments

4. Applicant's arguments, filed 06/24/09with respect to claims 1-18 have been fully considered but they are not persuasive.

Applicant argues that "The Office Action fails to establish a *prima facie* case of obviousness of claims 1 and at least because its reliance on Roberts's dies 1910 and 1911 to teach the heat sinks of claim 1 and 16 is completely unreasonable. Here, the Office Action states "note that HS1 and HS2 are sitting on top of heat extraction 204 which are

conducting heat to 204 therefore they are considering as the heat sinks [sic]" (Office Action, page 3). In other words, the Office Action concludes that dies 1910 and 1911 are heat sinks because they conduct heat to the heat extraction member 204. Applicants disagree. A heat sink is not merely a heat conducting member, as the Office Action suggests."

In response to Applicant's contention, it is respectfully submitted that since the light emitting diodes [dies] 1910 and 1911 the only places to GENERATE HEAT WHEN THE POWER IS ON and 204 is A HEAT EXTRACTION MEMBER (col. 30, lines 32-40) and in col. 30, lines 1-10 specifically said " Electrical contact to the cathode of each die is made through the base of the die, each which is electrically and mechanically bonded to the heat extraction member, through a wire bond 1905 and through electrical lead 1901." In another words, the cathodes of each dies [1910 & 1911] are conducting heat to the heat extraction member 204. Therefore, they are considered as part of the heat sink members.

Furthermore, Applicant's argument that 'Roberts does not teach that the bottom portions of dies are of metallic materials' This argument is neither proper nor consistent because as shown in FIG. 6, col. 17, lines 60-64 does specifically said "An optional metal coating 603 is typically formed on the back of the substrate 501 to improve contact consistency." And because since Roberts, one embodiment, FIGS. 19A-19B and Roberts, one embodiment, FIGS 5-6 teach on the same endeavor, One of ordinary skill in the art would have been motivated to make such a change so that to generate the claim invention with a reasonable expectation of success.

Additionally, Applicant states that "Furthermore, Applicants respectfully submit that the Examiner confuses an LED die with an LED package." Examiner respectfully disagrees because 1910, 1911, 1905-1908, 1901-1904 and 204 together claim an LED

package because of the claim language: "A high power light emitting diode package comprising." Moreover, the well known material such as copper, gold, silver, or aluminum are often use for heat sink for conducting heat on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Finally, the examiner considers the above references are still read on the claims. For the above reasons, it is believed that the rejections should be sustained.

CONCLUSION

5. **"THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action."

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to TONY TRAN whose telephone number is (571) 270-1749. The examiner can normally be reached on Monday through Friday: 7:30AM-5:00PM (E.S.T.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly Nguyen can be reached on (571) 272-2402. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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